

UNIT 2 CHEMISTRY

CH 17: MOLE CONCEPT REVISION (II)

NAME: _____

1 (a) Calculate the **amount of substance** in 1.25 g of benzene, C_6H_6 . (RAM $C = 12.0$, $H = 1.0$).

(b) Calculate the **number of mol** of sulfur atoms in 1.65 g of sulfur (RAM $S = 32.1$).

(c) Calculate the **mass** of 0.65 mol of water. (RAM $H = 1.0$, $O = 16.0$).

(d) How many **mol of H atoms** are present in 8.5 mol of ethane, C_2H_6 ?

2. Calculate the **percentage**:

(Use RAM $H = 1.0$, $C = 12.0$, $O = 16.0$, $S = 32.1$, $Ca = 40.1$).

(a) carbon in glucose (a sugar), $C_6H_{12}O_6$.
%C=

(b) water in gypsum, $CaSO_4 \cdot 2H_2O$
% H_2O =

3. Calculate the **empirical** and **molecular formula** of a compound containing (by mass) 40.0% carbon, 6.7% hydrogen and the remainder oxygen (ie ____ % O). The Relative Molecular Mass of the compound was $M_r = 60$.
(RAM $C = 12.0$, $H = 1.0$, $O = 16.0$).

(a) let **empirical** formula be:

(b) EFM(

4(a) Calculate the **concentration** of a nitric acid solution containing 6.30 g HNO_3 dissolved in 2.5 L of solution? (RAM $H = 1.0$, $N = 14.0$, $O = 16.0$).

(b) What mass of Na_2SO_4 is needed to make 500 mL of a 0.25 M solution? (RAM $Na = 23.0$, $S = 32.1$, $O = 16.0$).

ANSWERS: 1(a) 0.016 mol (b) 0.514 mol (c) 11.7 g (d) 51 mol 2(a) 40.0% (b) 20.9% 3(a) CH_2O (b) $C_2H_4O_2$ 4(a) 0.040 M
(b) 17.8 g 5(a) 2.4×10^{22} (b) 18.4 g. 6.24.31 7(a) 42.8 g (b) 55.6 g 8. 75.8% & 24.2%

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5(a) How many O atoms are present in 1.76 g of carbon dioxide, CO₂? (RAM C = 12.0, O = 16.0, N_A = 6.02 x 10²³)

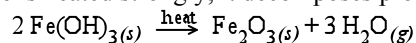
(b) What is the mass of 4.8 x 10²³ atoms of Na? (RAM Na = 23.0)

6. The following table gives data obtained from a Mass Spectrometer on the three naturally occurring isotopes of magnesium. Use it to calculate the Relative Atomic Mass of magnesium.

Isotope	RIM	% Abundance
²⁴ ₁₂ Mg	23.99	78.7 %
²⁵ ₁₂ Mg	24.99	10.13 %
²⁶ ₁₂ Mg	25.98	11.17 %

RAM(Mg) =

7. When iron III hydroxide is heated strongly, it decomposes producing iron III oxide and steam, according to the equation:



(RAM H = 1.0, O = 16.0, Fe = 55.9)

(a) What mass of iron III hydroxide would be required to produce 31.96 g of iron III oxide?

(b) What mass of steam would be produced from 220 g of Fe(OH)₃?

8. The Relative Atomic Mass of chlorine is 35.45. The 2 naturally occurring isotopes have RIM values of 34.97 and 36.98. Calculate the percentage abundance of each isotope.

Isotope	RIM	% Abundance
³⁵ ₁₇ Cl	34.97	x %
³⁷ ₁₇ Cl	36.98	%

$$\text{RAM}(\text{Cl}) = \sum \text{RIM} \times \% \text{ abundance}$$

$$35.45 =$$